Power efficient vehicle detection algorithm using wireless magnetic sensor node

Han B., Huo H., Chai K., Zheng C., Fang T., Liu H.

Institute of Image Processing and Pattern Recognition, Shanghai Jiaotong University, Shanghai 200240, China; Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, Shanghai 200050, China

Abstract: A new vehicle detection algorithm, called the adaptive window distance (AWD) algorithm using magnetic wireless sensor node, is presented. The algorithm can detect the occurrence of the end point in the vehicle signal by calculating the signal feature distance between the background window and the current window and by separating vehicle-coming and vehicle-leaving events from geomagnetic background to realize vehicle detection. Moreover, based on the energy requirement in WSN application, This algorithm uses 'Duty-cycling' policy to decrease energy consuming of the sensor node. Experimental evaluation on dataset collected by Honeywell HMC1051Z and NVE GMR magnetometer is given. Compared with ATA, the detecting result of AWD shows that the algorithm has higher accuracy (97%), stronger robustness and better power efficiency.
Author Keywords: Change point detection; Duty-cycling; Power efficient; Wireless sensor network

Authors with affiliations:

1. Han, B., Institute of Image Processing and Pattern Recognition, Shanghai Jiaotong University, Shanghai 200240, China

2. Huo, H., Institute of Image Processing and Pattern Recognition, Shanghai Jiaotong University, Shanghai 200240, China

3. Chai, K., Institute of Image Processing and Pattern Recognition, Shanghai Jiaotong University, Shanghai 200240, China

4. Zheng, C., Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, Shanghai 200050, China

5. Fang, T., Institute of Image Processing and Pattern Recognition, Shanghai Jiaotong University, Shanghai 200240, China

6. Liu, H., Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, Shanghai 200050, China